

of the skilled anesthetist; it is not the anesthetic of choice for the uninitiated, but only for the highly trained anesthetist."

* Geo. Crile, A. D. Bevan, C. Webster, Howard Kelley, Halstead, Andrews, Parker, Kolisher, Beck, Baccus, Lobdell, etc.

** By heating nitrous oxid about 100 gal. less gas is used an hour beside causing a deeper narcosis, more complete relaxation and less cyanosis.

*** Morphin quiets patient, gives better relaxation and less anesthetic is required after its use, and aids in avoiding shock. (5)

**** Gwathney has proved experimentally on dogs that even when respiration ceases it begins again spontaneously after removal of the gas and that it is almost impossible to kill an animal with nitrous oxid.

***** The cyanosis is, of course, very different from that caused by other general anesthetics, being deficient oxygenation merely while the cyanosis of ether and chloroform is due either to impaired heart action or to atony of the capillary vessels.

***** Crile says, "The difference is so striking that only a great emergency would now induce us to use ether instead of nitrous oxid in grave infections."

† Hewitt says (14), "There is no form of anesthesia at present known which is so devoid of danger as that which results from nitrous oxid when administered with a sufficient percentage of oxygen to prevent all asphyxial complications." He had given it 17,000 times. Thomas, of Philadelphia, (15) has given it 271,940 times with only one death.

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FRONTAL SINUS SUPPURATION.*

By HILL HASTINGS, Los Angeles.

On the subject of Frontal Sinus Suppuration, assigned to me for this evening, I will confine my remarks to a few points, lest I occupy too much of your time.

1st. Its Occurrence: There is no doubt that frontal sinus suppuration occurs more frequently than the general practitioner realizes, but not so frequently as suppurative otitis media. We specialists are apt to imagine we see hundreds of cases and yet if you carefully go over your records *you* are surprised to see how few case-records show frontal sinus suppuration. I have from my private records, twelve acute and thirty-four chronic cases. Of course, this does not include the many cases of "cold in the head," where for the time being there is in almost every case some inflammation of the frontal sinus. When one realizes that out of the thousands of cases of "cold in the head," but a few cases of frontal sinus suppuration remain as after results, one must come to the conclusion that Nature takes care of the great majority of all cases. Recovery takes place just as recovery takes place in cases of acute bronchitis, acute pharyngitis, acute pneumonia and other acute infectious diseases, which are self-limiting. But in the small minority of cases of "cold in the head," recovery is incomplete, one or both sinuses being left in a state of empyema. Such cases certainly need to be diagnosed, for most of them are capable of being cured. The patients themselves rarely complain of anything except "catarrh," but vague symptoms, such as dull headache and eyeache are frequently present.

2nd. Diagnosis: Antrum suppuration can be proven absolutely in every case by use of a trochar. On the contrary, frontal sinus suppuration can not be always proven without external operation, for in many cases I believe most of us will fail to satisfactorily catheterize the frontal. But we do have other means of arriving at a fairly sure diagnosis—1st, the presence of pus in the middle meatus, while equally significant of anterior ethmoidal disease, is nevertheless fairly indicative of frontal suppuration if the pus continues to drip, even after cleansing and mopping away, provided the antrum has been excluded by puncture; 2nd, trans-illumination in every nasal case should be a regular routine procedure. It is simple and quickly done. I think it of great diagnostic value, even though you may find it at times misleading. Suppose that it does fail you in a few cases, but serves you in the majority of cases, it is

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manifestly of great value. On these two signs one is justified in removing the anterior one-half of the middle turbinate and as much of the ethmoid as can be safely removed and then endeavor to prove the diagnosis by the catheter. Even then, in a few cases, one will fail to satisfy himself that he has put the catheter into the frontal sinus. The skiagraph is of value here, and likewise of value in determining the shape and size of the sinus.

In my series of 46 cases, 12 were acute empyema cases—that is, the “cold in the head” had cleared up, but the frontal suppuration was left unresolved; while 34 were chronic cases. The right frontal was affected 13 times, the left 13 times, and both 15 times, while four cases were not noted.

Trans-illumination was proven 22 times, and not recorded in 24 cases; frontal headache was complained of in only 18 cases; eyeache in only 12 cases; frontal tenderness in only 18 cases out of the 46 cases; frontal oedema, four times; frontal fistula, four times; (the result of incomplete operations).

The orbital complications noted are: edema of eyelids in seven cases; ptosis in one case (left frontal), displacement of eye in one case; retro-bulbar neuritis in one case * (probably resulting from posterior ethmoidal disease which coexisted); intra-cranial complication in two cases—one extradural abscess, found at operation without any preliminary diagnostic signs or symptoms; the other case, an extradural abscess, which had caused severe symptoms, namely, convulsions, followed by stupor. Both patients recovered after operation.

One of the 46 cases, a patient turned over to me during the absence of a confrere, turned out to be a sarcoma. That patient died several months later, and was the only case in which death resulted.

I, personally, operated by the external route in but four of the 46 cases and assisted in two other cases, making six external operations in 46 cases. Of the four personal cases, one was a double-frontal, in which a frontal fistula existed for over one year. The external operation was therefore a necessity. The second case presented a soft fluctuating swelling, result of necrosis of the outer table, and hence required external operation. In the third case there was no external defect, but external operative measures were taken because of severe frontal headache, acute tenderness, subnormal temperature, and vomiting. In the fourth case a “Killian” was done because the patient complained of severe headaches, but then only after three months of persistent and unavailing intra-nasal treatment, including catheterization of the frontal sinus as routine procedure. In the two consultation cases a fistula existed in one case; acute

tenderness, edema and fever in the other case. An epidural abscess was found at operation.

To recapitulate, six of the 46 cases were operated externally; while the remaining 40 cases were operated or treated by intra-nasal measures; and of the six cases, all but one had either fistula, fluctuating swelling or severe acute symptoms.

This experience about represents the conclusion I have formed in the last few years, namely that the external operation should rarely, if ever be done, simply because of the chronic nasal discharge; but there must be more severe localizing symptoms endangering life or fistula formation. I believe this for several reasons,—1st. The external operation is a disfiguring operation in most cases; 2nd, it is apt to be a failure in the sense that it does not always stop the discharge for which it was done; 3rd, it is a dangerous operation in inexperienced hands and not free from danger even in experienced hands.

For instance, Logan Turner in 1904 had collected 24 fatal cases as post-operative mortality. The craze for the radical external operation had then only begun; how many deaths have been reported since and how many more have occurred but never been reported, can only be guessed at.

The remaining 40 out of 46 cases were treated by intra-nasal measures. Time does not permit a full discussion of the various procedures. In a general way, removal of the anterior end of the middle turbinate, removal of polyps and diseased ethmoidal cells are the measures necessary to obtain better drainage from the frontal sinus. After this is done, most of the frontal sinus cases can be irrigated and kept clean and it is surprising how many will entirely recover simply as the result of securing drainage and mechanically cleansing the sinus. I have used argyrol in ten to twenty per cent. solution in several cases for periods of many months, thinking there would be some special virtue in argyrol. I cannot say that I secured any better result than from boric acid or normal saline irrigation. In one case I had cultures made of the pus from the frontal sinus and a vaccine made which I used for a month without any apparent benefit. This has been my only experience with the use of vaccine in frontal sinus trouble. In several cases I did a resection of the nasal septum, especially correcting the deflection of the uppermost part, so as to permit better view of the middle meatus, before doing the operative work in that region. I believe this is a most serviceable step, not only in securing better drainage but in permitting more thorough work and better catheterization. These intra-nasal measures are so safe and so manifestly improve the drainage possibilities that I believe they should be done in every case of frontal sinus suppuration. I have not attempted to enlarge the naso-frontal duct by any of the methods suggested for this operation. From the study of the anatomy of this region, I have felt that any attempt to enlarge the duct by chisel or gouge or rasp would be unsafe and unjustified in my hands. One must, however, conclude from reliable reports that there are a few men who have developed the skill and technic to perform this delicate operation successfully. I do not believe the average Nose and Throat man should attempt it.

* Reported, *Annals of Otolaryngology and Rhinology*, September, 1906.